International Journal of Information Science and Technology

SOME ISSUES ON IMPACTS AND CHARACTERISTICS OF INFORMATION AS WEALTH IN THE NEW ECONOMY[1]

M. Mohammadi, Ph.D. Student
Department of Library and Information Science
Islamic Azad University
Qom Branch, I. R. of Iran
email: librman2003@yahoo.com

A. R. Isfandyari Moghaddam, Ph.D. Student
Department of Library and Information Science
Islamic Azad University
Hamedan Branch, I. R. of Iran
corresponding author: ali.isfandyari@gmail.com

Abstract - Information has numerous potentials and features by which it can be used in various aspects of society. This paper aims to examine some roles and unique characteristics of information and supports the theory that information can be treated as wealth or wealth creator due to its vital impacts. Finally, it is shown that identifying information significance, the roles it plays and making better use of it can lead to personal, organizational, local, national, international and global effectiveness.

Keywords: Information, Wealth, Third Wave, New Economy, Information Economy.

INTRODUCTION

Capital used to be viewed in purely physical terms –factories, machinery and money– but since the 1990s, capital has also been classified in terms of intellectual asset that in this article we call it *information*. Information increasingly holds key to growth, output and employment, the role which was played by traditional factors of production such as land, labor and capital in the industrial society. Evolution of information as a commodity along with an established market, and a vast network of communication and decision making now characterize the dynamics of growth in advanced economies. The all-pervasive impact of information revolution has important implications for the economy at macro level in terms of increasing share of information activities in national income [4]. In other words, information is basic to human beings [17].

SOME ROLES OF INFORMATION BASED ON LITERATURE

Many researchers and theorists have viewed information in different aspects. For example, Thomas K. Jefferson (quoted in [7]) believes that information is the currency of democracy; Karp [16] called it intellectual capital; Carengie (quoted in [7]) suggests that information is a commodity for creating wealth; Felton and Finnie [12] put forward that knowledge (processed information) is the important factor of production in the

modern economy and a key to achieve competitive advantage; Oppenheim et al. [18] believe that information is an asset and Andriessen [2] names it weightless and intangible wealth and finally, regarding the value of information-based services in today's global economy, Derudie [10] puts information as wealth.

In information age or information society, in order to be precise, all affairs are based on information, i.e. any person, organization, nation and entity using information resourcefully can promote and advance. In addition, in information geopolitics, rank status and position of every political party depends upon its contribution to and impact on international information flow. It is important to remind that information has determinant role in some processes including "decision making" [15], "research and development" [1], and so on.

Information alongside energy, raw materials and other natural resources are of major elements of development and key guide to make decision. It is notable that economists also emphasize on this role of information. If a company has access to precise information about price of products and rivals' services, it can make opportune decisions on changing prices and market fluctuations. In other words, information causes company to make a profit. The report released by US Department of Transportation [22] indicates that knowing what other organizations have done or how they have confronted similar challenges is invaluable when making technical or policy decisions:

- Marshall's 1993 survey of banking managers documents the value of information in the decision-making process. Eighty-four percent of the 299 managers surveyed felt that the information provided by their company's information service contributed to better decisions. More than half said that the information led them to handle some aspect of an assignment differently. In cases where a decision involved a financial transaction, 74 percent estimated the value of the decision at more than $1 million.
- Respondents to Griffiths and King's survey measured the impact of information on work quality. Table 1 shows (from 1=low to 7=high) how respondents rated the quality of their work both with and without specific types of information.

Table 1: Information and quality of work (scale of 1 to 7).

	Journals	**Books**	**Internal Reports**
With Information	5.82	5.68	5.78
Without Information	4.04	3.57	3.52

Oniki [17] believes that information together with ICT have major economic impacts on the society as a whole including:

- Increase in efficiency in market transactions

- Timely supply of services
- Decreased mismatches
- Increase in the opportunity for transactions

- Decrease in erroneous decisions
- Decrease in erroneous expectations (decrease in uncertainty)
  - Decrease in bankruptcy, disequilibrium
- Support of making correct decisions on investment, employment, research and development
- Prevent from macroeconomic instability (business fluctuations)
- Expand markets--geographical and overtime (Increase in trade, international investment, futures and forward transactions).

According to above considerations, information is regarded as one necessity for personal and social advancement. Now, this question is posed that, can information be supposed and thought as national wealth for any country? Replying to this question requires wealth to be defined.

WHAT IS WEALTH?

Most of us associate wealth with money, our savings, our investments, our homes or other forms of “financial capital.” But do you know that the word wealth comes from the old English words “weal” (well-being) and “th” (condition) which taken together means “the condition of well-being”? [3]; the term was originally an adjective to describe the possession of such qualities. "Wealth" has come to mean an abundance of items of economic value, or the state of controlling or possessing such items, and encompasses money, real estate and personal property [23].

Considering this feature of wealth, there are questions such as what are economic characteristics of wealth?, which features a commodity should have to make us view it as wealth? and does information have these features? In order to answer the mentioned questions, we review economic roles of information and its features.

SOME REMARKS: CAN INFORMATION BE THOUGHT AS WEALTH?

In the book "*The third wave*", Toffler [20] describes three types of societies, based on the concept of ‘waves’, each wave pushes the older societies and cultures aside.

- *First Wave* is the society after agrarian revolution and replaced the first hunter-gatherer cultures.
- *The Second Wave* Society is industrial and based on mass production, mass distribution, mass consumption, mass education, mass media, mass recreation, mass entertainment, and weapons of mass destruction.

- *Third Wave* is the post-industrial society. Toffler [20] would also add that since late 1950s, most countries are moving away from a Second Wave Society into what he would call a Third Wave Society. He coined many words to describe it and mentions names invented by others, such as the *Information Age.*

In the other book, Toffler [19] attempts to address central importance of power. He believes that because needs and desires are highly varied, the ways of meeting or denying them are also extremely varied. There are, therefore, many different "tools" or "levers" of power among which, however, *Violence*, *Wealth*, and *Knowledge* are primary. Most of other power resources derive from these tools. Violence, which is chiefly used to punish, is the least versatile source of power. Wealth, which can be used both to reward and punish, and which can be converted into many other resources, is a far more flexible tool of power. Knowledge, however, is the most versatile and basic, since it can help one avert challenges that might require the use of violence or wealth, and can often be used to persuade others to perform in desired ways out of perceived self-interest. In his opinion, knowledge, that in fact is processed information, yields the highest-quality power. Knowledge is even more maldistributed than arms and wealth. Hence a redistribution of knowledge (and especially knowledge about knowledge) is even more important than, and can lead to, a redistribution of the other main power resources. He emphasizes on increasing role of knowledge in economic and political decisions and predicts that a new order is being formed. The most important feature of this modern order is increasingly relying upon information, knowledge and their exchange. He concluded that as a result of this power shift in countries and world-wide level, international emperors namely Europe, Japan and US will face up to many problems. Henceforth, success and being pioneering are with someone who owns international information flow. One of Toffler's key points is that the nature of power is changing because knowledge including art, science, moral values, information (and misinformation), now provides the key raw material for wealth creation [10]. In other words, in the information age, proverb "knowledge is power"[3] has become a reality.

Castells, in his comprehensive three-volume series entitled "The information age: economy, society and culture", posits that today's world societies are increasingly structured around informationalism which in his opinion, is a new phrase of capitalism.

Hill [14] points out that during recent decades, information revolution has shifted macro source of power. Today, wealth source is not material but information is generator of value.

Therefore, not only information which can lead to knowledge is, as such, power source, but also it is among components producing (creating) wealth.

ECONOMIC FEATURES OF INFORMATION AS WEALTH

Fenner [13] indicated that "society regards information as a commodity and the possession of it as an asset. Economists would like to account for information in the same way as physical assets, but no discipline has given us an accepted model for such treatment. Disciplines regard information differently, and it is more difficult to develop systems to measure information than physical commodities. Information has become an element of commerce. In earlier times, success was based on such criteria as control of finance, physical resources, writing, food, fire or shelter. Today, successful people and businesses are those who control information: its development, access, analysis and presentation. We refer to our era as the information age. We buy and sell information, sometimes with money and sometimes by trading it for other information".

However, information has unique specifications by which it differs from other economic and commercial products.

- IMMORTALITY

Violence and wealth are destructive as well as mortal, while information is permanent so we can increasingly produce information more than before.

- SIMULTANEOUS USE AND NON-RIVALROUSNESS

Information can be consumed by several persons at the same time. It has become possible by means of technological facilities which have created a new economy called "*network economy*". Information can be consumed by one person and still be provided for others at no additional cost [13]. The non-rivalry attribute of information -the ability to use such asset in simultaneous and competitive applications without diminishing its usefulness- is a major driver at business, as well as national level; whereas most physical and financial assets can be leveraged to only a limited degree, by exploiting economies of scale in production.

- ABILITY OF CREATING ADDED VALUE IN PRODUCTS AND SERVICES

Information is a vital product with capacity to provide added value and that as time passes, the strategic importance of information increases. In addition, the more information is used, the higher becomes its value. As electronic resources emerged, this information feature has been reinforced. That is, in current time, electronic information can be transferred easily with minimum cost. It may be dispatched to far distance consumers via telecommunication channels. Distribution of e-books, e-periodicals,

e-files, e-records and the like, on regional, national and global scales is a common practice nowadays. The ease of transfer of information in a networked world (i.e. via the Internet) is the very core of the concept of an information society, expected to release unprecedented cultural and political changes around the world. Also, information can be accessed and "consumed" when the user is willing to. This attribute is much valued by consumers of information. That is, they need not to be present at a specific time and place in order to be able to use information [11].

- JOB CREATION

From an economic perspective in the information society, information plays increasingly a vital role in process of production, distribution and consumption especially in the case of innovation as well as competition. In this society, four factors including computer, microprocessor, telecommunication and information affect the creation of new jobs. They have considerably influenced on production rate and reduced role of agriculture. Webster [24] believes that in 1990s, approximately half of American workforces were involved in the information sector. Now, this growth rate of creating new jobs in the information sector is estimated 500%. In this regard, US Census Bureau has reported more than 400 different jobs relating to production, reproduction, exchange, transfer, refinement, analysis, interpretation, synthesis, and regeneration, processing, dissemination and distribution of information.

- ABILITY OF REDUCING COSTS

A number of studies and experts consulted for the report of US Department of Transportation [22] cited the following cost savings resulting from access to information:

- New York State DOT[4] (NYDOT) estimates life-cycle cost savings of nearly $9 million per year resulting from a new concrete mix for bridge decks that was developed as the result of a literature search. The new mix was implemented by NYDOT in less than a year.
- Illinois DOT saved approximately $300,000 through access to research at Louisiana State University on heat-strengthening of steel bridges.
- For New York, an innovative horizontal drain system discovered at a TRB conference not only solved a landslide problem, but also yielded net savings of more than $2.5 million over conventional stabilization treatments.
- In the private sector, Texas Instruments calculated a 515 percent return on its investment in library services.

• A subsidiary of another major U.S. manufacturer found that the information produced by a series of literature searches performed by its corporate library was worth about $400,000 and cost the company just $17,000.

• According to Griffiths and King (1993; quoted in [22]), firms without libraries spend 2 to 4 times more to acquire information than those with in-house libraries. Obtaining information through the use of alternative sources costs 2.3 times as much as acquiring the same information through an in-house library.

• Table 2 shows benefit-cost ratios for in-house information services range from 16 to 1 (Georgia Technical Institute) to 3 to 1 (Paccar, Inc.).

Table 2: Benefit-cost ratios for information services.

Georgia Technical Institute	16 to 1
Exxon [See Koenig, 1992.]	11 to 1
Minnesota DOT	9-10 to 1
NASA [Ibid.]	7.6 to 1
Paccar, Inc.	3 to 1

- PROFITABILITY

Reports on the added value of information released in some countries or economic sectors indicate the strategic attention paid to this matter; for example, the Government of Shanghai's official website (2004) states that the information industry in that state generated 35.04 million Yuan in the year 2000. That figure shows a 28.8% growth compared to the previous year. The profit gained from the production of information was 1.25 billion Yuan, and that figure for information services has been 12.09 billion Yuan -a 13% growth compared to the previous year (quoted in [11]). Considering economic performance of five major companies in ICT namely Microsoft, Dell, Cisco, Compaq and Intel shows that they have invested 12 billion dollars in stock exchange in the year 1987 and gained 600 billion dollars in 1997. That is, in fewer than 10 years thay have had a growth rate equivalent with 50 times more than the first investment. Hill [14] indicates that according to UK Office for national Statistics (ONS), UK's revenue from e-information industry was 2881 million pounds in the year 1994. This figure equals with Iran's revenue gained from oil commerce in the same year. Undoubtedly, this figure has increased since then. Webster [24] puts forward that more than 46% of US's GNP is indebted to the information sector. Accordingly, Apte and Nath [4] measured that more than half of US total GNP in 1992 was generated by information related activities[5]. Also, Azad et al. [5] showed that there is relation between GNP ratio and information production and consumption. Their findings demonstrate that in most of Scandinavian countries, the rate of development indicators

is high, and the amount of information production and consumption in these countries is higher compared to other regions.

Overall, one can conclude that compared to other businesses, information industry is more profitable and this profitability will still go forward.

- ABILITY TO BE PURCHASED AND SOLD

Many purchasable commodities could be purchased first, and then sold for a higher price. Information is not an exception to this rule. The producer of information may sell it many times over. The buyer, in turn, may also sell that information in certain conditions. Hayes (1997; quoted in [11]) considers this attribute as "*capital resource"*. He stresses that information could be sold or given away without loosing the value and the content. The more a piece of information is capable of being bought and sold, the more its value may be increased. No doubt, because of the increasing educational, research, industrial, and economic activities on a global scale, the trend of production (provision) and consumption (demand) is surging. The increasing number of publishers, information suppliers and Internet service providers (ISPs) and the overwhelming production of a variety of electronic information resources and databases are indications of demand. This shows the capability of information as a commodity.

- REPEATEDLY USABILITY AND REUSABILITY

One distinctive attribute of information is that it can be used repeatedly. In other words, unlike many other assets, information is reusable. For example, some information an individual or a company generates or buys for some purpose could be used for other purposes, even by other individuals and companies. Think of the photocopy made of a journal article through a document delivery system. Another example is when others who borrow through inter-library loan use the resources of a library, which have been acquired to meet the needs of that library's target users [11].

- SHARABILITY

Some commodities are capable of being used simultaneously by multiple users. Information is one such commodity that enjoys this capability at the highest level. It is able to be used in high amounts without any depreciation caused by multiple uses. For example, many users might use a certain book. In the same way, tens of users or several libraries could use an electronic source or a database at the same time. Overall, "resource sharing" has allowed optimization of information resources over the last two decades. Resource sharing has proven its economic value. Computer technology and

networks have greatly facilitated this sharing [11].

- PRODUCTIVITY

New economy or, to be precise, knowledge-based economy [8] is heavily associated with intellectual assets including knowledge and information. Also, significant proportion of economic outputs depends on amount and type of information as well as knowledge used in production process. Information is used to design and produce all types of products. In this stage, i.e. when a finished product enters market, information used is called "*frozen information*". As a result, it is obvious that not only information can be viewed in producing any commodity, but also it is supposed as the most important factor of production in the economy of developed countries. In addition to this feature, Botelho and his colleagues [6] suggested that information is a major parameter in the evaluation of countries' development stages.

CONCLUDING REMARKS

Identifying information significance and roles it plays can lead to personal, organizational, local, national, international and global effectiveness. This will increase the potential of exploiting information which can gain so many benefits for citizens of information society. If Toffler's synthesis about the fast-arriving civilization of the 21st century is accurate, then our capacity to manage knowledge, information, and data is a critical factor in our future success [10].

According to what has already been said in the present article, it can be concluded that information is a vital product with capacity to provide gains and that as time passes, the strategic importance of information increases. This is due to the mentioned features of information. Overall, the conclusions in this paper support the theory that information has the potential to be assumed as wealth or, at least, as source creating wealth. It is recommended that further research is conducted to measure how information and its outputs can contribute to and influence on various aspects of modern society.

ACKNOWLEDGEMENT

Special thanks to Dr. Fahimeh Babalhavaegi because of her guidance.

ENDNOTES

1. The New Economy, also known as the "Digital Economy" [9], is a term that was coined in late 1990s. In fact, the new economy is that strategic combination

of organizational changes, policy settings and capacity building based on the innovation and creativity promoted by expanded international trade and global, networked information technologies, which achieves sustainable economic growth and social wellbeing [21].

2. This is a commonly used phrase and concept, a translation of a Latin maxim by Francis Bacon, "**scientia potentia est**", implying that with knowledge, information or education one's potential or abilities in life will probably increase.

3. This is a commonly used phrase and concept, a translation of a Latin maxim by Francis Bacon, "**scientia potentia est**", implying that with knowledge, information or education one's potential or abilities in life will probably increase.

4. Department of Transportation.

5. Information related activities include all resources consumed in producing, processing and distributing information… (Porat, 1997; quoted in [4]).

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